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Dairy and Poultry in India— Growing Corporate Concentration, Losing Game for Small Producers

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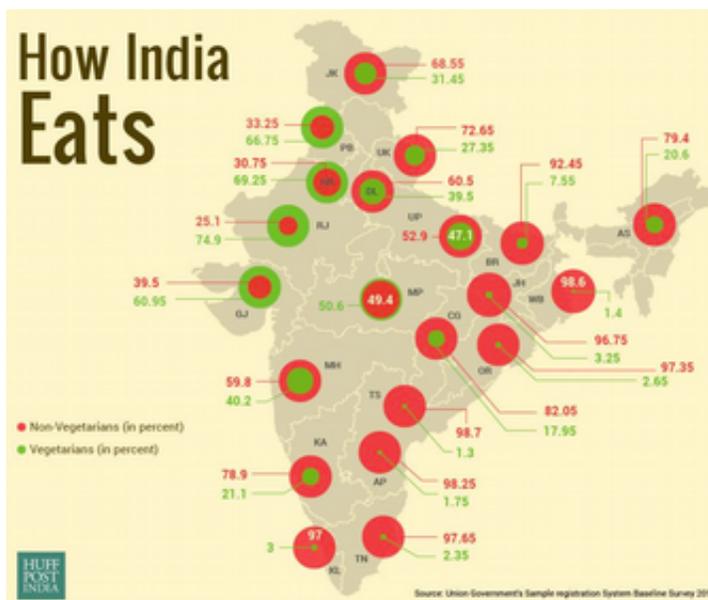
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Dairy and Poultry in India—Growing Corporate Concentration, Losing Game for Small Producers

by Ashlesha Khadse

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Vegetarianism is assumed to be the norm in India. But Indians are consuming more meat, eggs and dairy than ever before. As Indian agriculture responds to this



Statewide percentages for vegetarian versus non-vegetarian consumers. Trends point to increasing meat consumption—70% of Indians now consume meat. (Source: (Bose 2016) [based on Government of India survey, 2014])

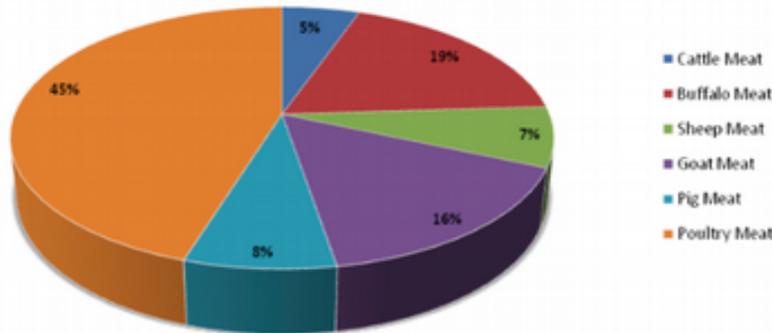
growing demand and becomes increasingly integrated into global markets, profound changes are taking place in India's livestock sector, a sector that is crucial to the livelihoods of India's millions of small and marginal farmers, pastoralists and indigenous people. India's livestock sector is one of the largest in the world, numbering 512 million, and holding 11.6% of the world's livestock population (GOI, 2014).

Despite India's booming success in cooperative models of production, especially the dairy cooperative movement that turned it from a milk deficient country to the world's highest milk producer, there is a growing push towards free trade, privatization and hyper competitiveness. Such a race to the bottom is changing production

models towards more resource-intensive, high-yielding styles of production, and the majority of our farmers—comprising mostly landless, marginal to small ones—are finding it increasingly hard to maintain and keep milch animals as they have traditionally done. Government data indicates that the number of bovine holdings has steadily decreased over the years from 230 million in 2002–2003 to 204 million in 2012–2013, with cows decreasing more than buffaloes (12.33% versus 9.21%). Bovine is more concentrated in the medium to large categories of farmers, while chicken and pigs in the small to landless categories. Chicken populations have increased dramatically by more than 1.4 times from 182 million (2002–2003) to 255 million (2012–2013). This is due to the rise in commercial poultry farming (NSSO, 2014).

Indian farmers have customarily integrated livestock into their farming; crop residues fed animals, and the animals in turn provided manure, milk and meat. This has been a low input system. Indian livestock was never one that was bred on concentrated grain feed in factory farms, as is the norm in industrial farming. Beef

Graph 5.3: Species-wise Meat Contribution(%)



Species-wise meat contribution in India. Chicken is the most popular meat followed by buffalo meat. (Source: (GOI 2014))

production in India (mainly carabeef/buffalo meat) has been fairly ecologically sustainable, only existing as a by-product of the dairy sector, fed on crop residues and not relying on concentrated grain feed, or deforested tracts of land for grazing. Farmers only sell male buffaloes or spent females. Cows are generally not eaten by Hindus due to religious

reverence, but commonly consumed by other minorities like Muslims, Christians or Dalit communities. Recently, there has been a wave of fanaticism by upper caste Hindu's around cow eating, and various groups have been subjected to violence by the so-called right wing 'gaurakshaks' (cow protectors) (Moore, 2016). Some states have banned cow slaughter, however a few like Kerala allow them. Many illegal slaughterhouses abound. Male calves and especially old bulls are either abandoned or sold to slaughterhouses where, along with spent cows, they are processed for leather, meat or for the rennet in their stomachs that is used for cheese making (MacDonald and Iyer, 2012).

The beef export sector is thriving. India is the world's largest exporter of beef (mainly carabeef) which is primarily from animals culled from the dairy sector (Landes et al., 2016). However, with an increasing push to grow cash crops, livestock rearing has been disconnected from farming. Now farmers need to buy expensive fodder for their animals. A heavy promotion of exotic, high-yielding breeds by the government has led to reliance on high inputs and aftercare, medication and water, all with detrimental consequences on their livelihoods and the environment.

Traditional pastoralist communities are completely under threat—their grazing/common lands have disappeared, and they are forced to 'settle', fenced out of areas that traditionally belonged to them, many shifting to other occupations. Grazing areas surrounding forests too have been blocked by the forest bureaucracy, which instead promotes plantations in such areas (Bhaduri, 2013).

This brief report provides an overview of the key challenges affecting two fast transforming areas of the livestock sector in India—dairy and poultry. These are two sectors that are moving towards production models that are not sustainable or desirable given the ecological crisis and widespread hunger and livelihood loss ongoing both globally and in India. These are also areas that have great potential to provide sustainable livelihoods and nutrition security to millions. The urgency to put them under a spotlight and imagine alternatives is great.

The report will first look at the dairy sector followed by poultry and finally provide a set of recommendations for policy makers.

Indian dairy—the world's highest producer

Dairying plays a major economic and social role in India for small-scale producers, especially women. India is both the world's largest consumer and producer of milk—17% of the world's milk comes from India, and the country maintains the largest bovine herd in the world. Currently the domestic demand for dairy is outpacing production and milk is mainly for local/national consumption. Thirty percent of Indian dairy production is handled by the organized sector (including cooperatives of the private firms), and 70% is handled by the unorganized sector (Singh, 2012). One-third of the organized sector is controlled by one large cooperative alone—Amul (Ramdas, 2015a). Thus, the majority of milk producers still remain outside the formal milk supply chain selling directly to consumers and local businesses like restaurants, tea shops etc. Increasing privatization, and liberalization has led to a competitive milk market, a so-called dairy boom in India and private players have begun to overtake the market share of the cooperatives. Industry sources claim that it took the private sector just 20 years to surpass the market share acquired by the dairy cooperative sector over nearly half-a-century (Sood, 2014).

With industrialized country markets virtually saturated with dairy products, their corporations are looking towards Asian markets, especially India's which is one with high dairy consumption, for expansion. This hyper competitive environment has led to a situation where the major players and especially the dairy cooperatives, now under pressure, are constantly trying to outdo each other to capture a growing market by practices which are turning out to be harmful for the survival of small milk producers (Ramdas, 2015a). A key concern then is the impact of the dairy boom under the free market model on the largely small milk producers of India.

Dairying in India is dominated by marginal, small scale, landless producers, typically owning less than five cows or buffaloes. The model that still dominates in India is that of low input/low output, with both production costs and yields being some of the lowest in the world (Emmanuel Lagos and Intodia, 2015). Larger dairies with more than 200 cows are coming up slowly in some peri-urban areas and through private investments. Buffaloes are the preferred milch animals, producing more than 50% of the milk (Islam et al., 2016), due to the high fat content in their milk as well as the possibility to sell them for slaughter. The cow slaughter bans in most states have made it difficult for farmers to deal with spent cows.

The success of the Indian dairy cooperative—the White Revolution

The organized dairy sector has its roots in farmer cooperatives that come out of a development program lauded as a great success called Operation Flood. This program managed to connect a diversity of very small producers (selling even just one liter a day). Instead of increasing milk production through improved breeds or large-scale infrastructure, it mainly focused on connecting small producers to pre-existing markets. Women were a big part of Operation Flood and 6000 women's dairy cooperatives were established (Duncan, 2013).

While not without its criticisms, from a policy perspective, Operation Flood was successful in proving the role of agriculture and especially livestock in poverty reduction. It improved livelihoods and incomes of small peasants and livestock keepers, especially women in rural India. It set up more than 55,000 dairy

cooperatives. It established fair pricing policies to benefit both producers and consumers. Milk production increased during the Operation Flood period. In its last year 9.3 million producers were supplying 10,900 metric tonnes of milk a day (Duncan, 2013). The model is a great example of a local food system—based on a three-tier system of village unions, district unions and state-level federations, prioritizing local consumption and selling excess milk to state federations for marketing.

The dairy cooperative network in the country today includes 254 cooperative milk processing units, 177 milk unions covering 346 districts and over 133,000 village-level societies with a total membership of nearly 14 million farmers (Planning Commission, 2012).

This model is fast becoming replaced by a free market model, with the influx of many private players, and a hyper competitive environment which has led to a price war between the great Indian dairy cooperatives and private companies. In such an environment, the dairy cooperatives are forced to adapt the same aggressive marketing practices as private players—dumping cheap recombined milk into the market, pulling procurement prices down, and pushing small farmers out of business (Ramdas, 2015a; Srikrupa et al., 2016).

Post Operation Flood—Mission Milk (1990s and beyond)

Even if India is still dominated by the small-scale milk production, there is a trend towards intensification, vertical integration and a risk to small farmers. The National Dairy Plan has replaced Operation Flood, with an aim to increase national milk production in India by 6 million tonnes annually over the next 15 years, supported by international funders like the World Bank. There is an increasing emphasis on technology-dependent productivity framing Mission Milk that moves India further towards what Philip McMichael has referred to as a 'corporate/neoliberal' food regime (Duncan, 2013; McMichael, 2009).

Trade and liberalization

The Indian dairy sector has gone from a cooperative model protecting small farmers, to a trade liberalization model of hyper competitiveness. The 1990s saw various legislative amendments to increase the growth of private dairy players, for example 'The Milk, and Milk Product Order, 1992. S.O. 405(E)' and the ending of quantitative restrictions after joining the WTO in 1995 (Srikrupa et al., 2016). Today various programs offer support to increase private sector dairy development. For example, the Dairy Entrepreneurship Development scheme provides subsidies of up to 25–33.33% for private dairying activities (Emmanuel Lagos and Intodia 2015).

India has always maintained high import tariffs (up to 60%) in dairy, but it created a tariff-rate quota of 15% for 30,000 tonnes since 2009 (Paasch et al., 2012). One of the key issues for the EU in the ongoing EU India free trade agreement negotiations is the reduction of tariffs in India's dairy sector. Given that the EU had abolished its dairy quotas in 2013 and this has led to massive over production of milk there, the EU has been looking for new markets to dump its milk surplus and India is a key prospect for them.

Dairy exports from India are at a minimum due to high national demand. It mainly exports non-fat dry milk to milk-deficient neighbouring countries such as Bangladesh, Pakistan, Nepal, Bhutan, and the United Arab Emirates (Emmanuel Lagos

and Intodia, 2015). India's dairy imports are also minimal due to high import tariffs; however, there are irregular imports of milk powder and butter.¹

Entry of foreign players and mega-dairies

In 2011, the government allowed 100% foreign direct investment in food processing, including milk and milk products, and also provided several tax breaks to foreign investors, and thus allowed entry of foreign players (Srikrupa et al., 2016). This resulted in many transnational companies eyeing India's milk market mainly in the back end of the chain—to produce value added products like cheese, paneer, and flavored yogurts to meet a growing demand from rising middle classes. Many local dairy processors are being brought out through mergers and acquisitions by global private players like Danone, Carlyle, French dairy processor Le Groupe Lactalis, and Nestlé (Ramdas, 2015a).

Recently there is also a growth in mega milk factories based on the concentrated animal feeding operation (CAFO) model by foreign investors who need to tie up with local companies in order to directly produce milk. Most of these Indian companies come from unrelated sectors like mining or real estate (Bhosale, 2010). This dairy boom in India is based on the organized sector vying to capture the massive unorganized milk sector of the country—70% of the total dairy sector falls out of



Bhagalaxmi dairy farm - India's first CAFO (Source: Gowardhan, 2016).

cooperatives or private companies and is unorganized. For example, the US-based Schreiber Foods (the main dairy supplier for McDonald's) has tied up with the Indian Goenka real estate and hospitality group for its so-called "future ready" mega dairy farm Schreiber Dynamix with 6000 cows of mixed European stock in Baramati. This farm supplies to Danone, Nestlé, Kentucky Fried Chicken and Starbucks. This CAFO, sold to another investor, was in the news for starvation deaths of animals. A video uploaded on

youtube by news channel TV9 shows the poor conditions of animals here (TV9 Marathi, 2015).

Bhagalaxmi dairy farm with its 2500 Holstein Friesian cows was India's first automated CAFO (Gowardhan, 2016). Fronterra wanted to join IFFCO to set up a mega dairy farm with 40,000 cows—India's largest ever—by importing more than 9000 pregnant cows from New Zealand and Australia (Grain, 2014). This Project was however blocked by the state government due to high public opposition. An Israeli real estate firm, Elbit Imaging, was to set up a \$100 million, 10,000 cow dairy unit in

¹ Recently, however, despite high import tariffs on butter (30-70%), imports of butter fat have gone up. This is mainly due to Indian dairy's attempts to prepare recombined milk from its excessive stocks of Skimmed milk powder that it sold in the market and reduced procurement of fresh milk—a major cause of the milk crisis in India (Srikrupa et al., 2016).

Gujarat, the territory of India's largest cooperative, AMUL. It planned to import 10,000 high yielding cows from Israel and has received support from the state, especially via land grants (Shah, 2008). 500 acres of land were leased until 2038², but the dairy farm has not been set up yet.

Ecological Impacts: Advocates in industrialized countries have already documented the devastating consequences of the CAFO model on the environment and public health. For example: Excessive water use and groundwater pollution has been a constant issue in US "mega-dairies" (MacDonald, 2014). There is an increase in ammonia and nitrogen deposits in the soil as well as microbial pollution of aquatic ecosystems, eutrophication of streams and rivers (Mallin and Cahoon, 2003). Many small to medium commercial cow enclosures or *tabelas* in India—most of which exist inside cities—have absolutely no means of sewage and leave the feces to contaminate the area.

Public health: Recent studies in various regions of India have discovered antimicrobial residues in food animal products (such as chicken meat and milk), indicating that antibiotic use in food animal production is widespread and leading to antibiotic resistance (Laxminarayan and Chaudhury, 2016). Antibiotics, growth boosters and hormones, anti-parasitics, urea and other chemicals have been commonly advocated in the past to boost livestock production and to supposedly get rid of infectious disease. Anti-parasitics and toxic chemicals like ivermectin, butox and even DDT have been recommended to keep ticks and fleas at bay. These often mix in animal feed and enter the animal and impact livestock products such as milk, meat and eggs (Ghotge and Ramdas, 2016).

Animal welfare: Animal welfare activists have also opposed the CAFO model, which create stressful, unnatural environments for animals that are kept in continuous confinement and overcrowded stalls or caged conditions (Berger *et al.* 2014). Cows get hoof lesions from the inability to move and constant milking causes mastitis. Machines cause excessive milk extraction and in many cases continue to run even after milk has drained, causing excessive pain. Many local *tabelas* (commercial cow enclosures now springing up in many cities) follow a similar CAFO-like model, but on a smaller scale and in an even less regulated form. Oxytocin, even if banned nationally, is regularly used in such dairy operations to raise milk yields. Oxytocin causes the cow's uterus to contract, mimicking intense labor-like pains for the animal. In India there are regular uses of unprofessional artificial insemination, which ignore all care, insert unsanitary objects into the cows uterus, and cause immense pain to cows. Many *tabelas* don't have drainage and the animals are left to stand in their own feces for months. A video by People for the Ethical Treatment of Animals showcases many such cases of unethical treatment of cows and buffaloes in India's dairy farms (People for the Ethical Treatment of Animals 2011) On the other hand, '*Such events rarely occur in*

² Information of land lease is based on the form 20 F submitted by the corporation Elbit Imaging to the **UNITED STATES SECURITIES AND EXCHANGE COMMISSION**. **Link:** <http://bit.ly/2gzCnLH>

individual farmers homes- they treat animals as a part of their families, they love them, they have names for them and hesitate to let them go to slaughter when they are old,' said Kannaiyan Subramaniam of the South Indian Coordination Committee of Farmers' Movements.

While not all large players focus entirely on CAFOs, they also procure directly from farmers, and important concerns remain as to the accountability of large private players and the rights of producers and nature. Given the large number of small milk producers in India, it makes little sense to invest millions in corporate CAFOs.

India's ongoing milk crisis due to a flawed free-trade market model

The milk price crisis is global in nature and the small to mid-size farmers, especially in the EU, are struggling against falling milk prices (McFerron, 2016). Mainly triggered by an overproduction in the EU, due to an end to quotas in 2013, and slowing demand from China and Russia (in retaliation for import sanctions from the EU), the resulting glut in the global market has led to a subsequent price crash.

This crisis has also impacted India adversely due to its integration into global markets (Gopalan, 2015). One of the major drivers behind this crisis is the excessive glut of skimmed milk powder (SMP) produced by large dairy Indian cooperatives. As they were unable to export into the global market due to a pre-existing glut and crashing prices, instead they started to recombine SMP with imported butterfat, despite high import tariffs, to create recombined milk. This recombined milk, although identical in appearance with fresh milk, is not the same. The result of the dumping of recombined milk into Indian markets has pulled down fluid milk prices, destroying the livelihoods of scores of small milk producers of India (Srikrupa et al., 2016). Recent media reports show that small farmers are dumping their milk on the streets in protest not only because prices are low but also because dairy cooperatives are reducing procurement ('Farmers Dump 30,000 Litre Milk on Road as Omfed Refuses to Buy', 2016).

On the other hand, there is an ongoing price war between cooperatives and private dairy players. All trying to capture the most market by driving out competition, both groups are selling at rock bottom prices, pulling milk procurement prices down, way below production costs and pushing small farmers out of the market (ICCFM and FSA, 2015).

The key issue here is the industrialized commodity style food production system and free trade model, one which has not only destroyed the livelihoods of European farmers, but also of farmers in India. Dairy in India has always been a sector that exemplified the possibilities of building a localized and fair food system, however such liberalization measures to open the market have forced changes in the behavior and values of Indian cooperatives and turned dairying into a race to the bottom.

The Indian cow is almost extinct—biodiversity loss with growing industrialization of milk

'First we blame our cows for low milk yield without considering the field constraints. Then we replace those cows with exotic breeds that are more vulnerable to the same constraints. Meanwhile, our desi (native) breeds keep setting new records abroad'. —A senior veterinarian at a government hospital in Mumbai (Mazoomdaar, 2013)

Referring to Quimbanda Cal, an Indian (*Bos Indicus*) Gir cow in Brazil, who broke its own 2010 record of delivering 10,230 kiloliters of milk a year, with a daily yield of 56.17 kiloliters, the veterinarian quoted above highlights the problem with Indian policy which values all things foreign but ignores the hardiness and potential of local solutions. The Indian governments post Operation Flood plan of 'scientifically increasing productivity of animals,' has led to imports of exotic bull and semen of European stock like Jersey and Holstein-Friesian cows for distribution among farmers to artificially inseminate local Indian cows (Rupera, 2013). Their argument is that Indian cows are low yielding cows, but the same Indian cows have broken the world record in milk production in Brazil, through improved external conditions like water, feed and care. While the European breeds do not produce at the same levels in India because of their inherent unsuitability to Indian conditions. The irony is that the Indian government is now importing Indian bull semen from Brazil (Davel, 2016), hoping that this would somehow magically increase numbers of the fast vanishing indigenous cows.

This has led to a systemic destruction of the indigenous Indian cow which has developed over a millennium but today is at the risk of being wiped out through cross breeding. India has 37 pure cattle breeds. Five of these—Sahiwal, Gir, Red Sindhi, Tharparkar and Rathi—are known for their milking prowess.

Importing foreign cows to India is unsustainable—farmers incur huge costs in rearing them, many invest high amounts of money only to find that they die of diseases. Foreign breeds are more susceptible to tropical diseases, cannot stand changes in temperature or rain, have a very short milking life in comparison to the Indian cows, and require immense water, specialized feed and antibiotic inputs. They need to be kept in very high-cost, air-cooled shelters, and require expensive stall-feeding and medical care—facilities that poor farmers cannot provide. Producing their milk is expensive.

On the environmental front, an average exotic crossbreed requires at least four times the water a local breed does. Farmers are literally mining precious groundwater to keep these cows alive. A country with many drought prone areas cannot afford to promote such unsustainable production. Only large dairies can afford their upkeep making the loss of local diversity a major issue for the viability of cow rearing for small farmers in India.

On the other hand, local Indian breeds are very low-maintenance, and they are weather and disease resistant. For example, the Vechur breed, the worlds smallest cow from Kerala state is called the zero maintenance cow because it needs no special feed, can eat kitchen waste, needs no special sheds or care, can tolerate heat and rain, and yields milk with a higher fat content than most European breeds, making its milk very prized among consumers (Sainath, 2012). This cow has been brought back from near extinction, due to the efforts of some dedicated activists. *'Local breeds are more suited to Indian farmers, but these are fast disappearing',* says Chukki Nanjundaswamy of Amrita Bhoomi Center, La Via Campesina's agroecology school in India. *'Even if one wants to buy them, and they cost less than the foreign cows, it's very difficult to find them. We need to conserve and spread*

the local cow breeds so more farmers can access them’.

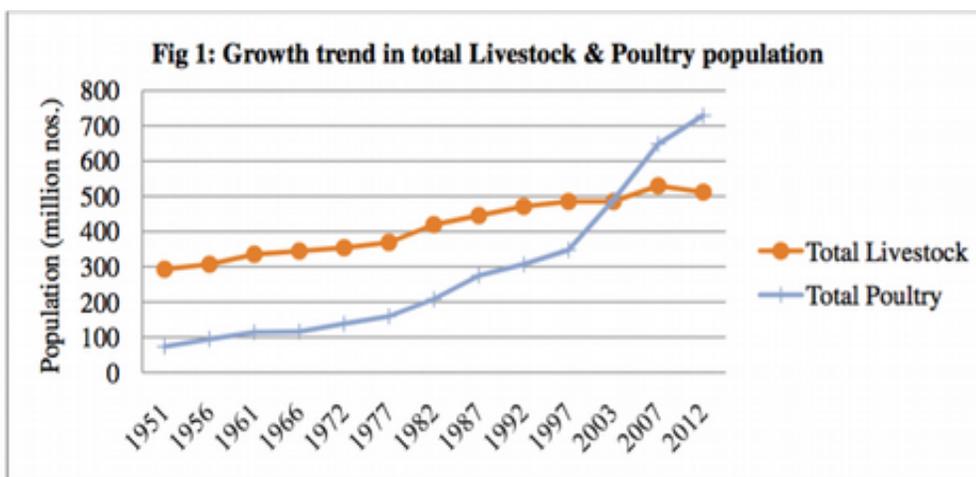
‘Tysonization’ of the poultry sector in India

Tyson Foods USA was the first to set up the model of vertical integration in the poultry sector in the USA. It bought up feed plants, hatcheries, contracted producers, and built processing plants. The system was such that Tyson owned each of its millions of chickens from before they hatch to the day they're slaughtered, taking on contracted farmers to do most of the work/risk of growing them. Now the same model has come to India (Nierenberg, 2007).

Poultry consumption and production

Egg and poultry production and consumption in India is surging at a high growth rate of 8–10% (APEDA, 2016a). Rate of chicken consumption has surged by 181% in urban and 256% in rural India from 2004–2005 to 2011–2012 (Mallapur, 2015). It's the world's third largest

producer of eggs and sixth largest producer of chicken meat (USDA, 2013). Chicken is the most popular meat in India, and more so, given the religious taboos around consumption of beef (Hellin et al., 2015). India's per capita consumption of poultry is at 2.5



Source: Islam et al., 2016

kilos per person and has increased steadily over the last decades.

Household backyard poultry production (mostly by women for self consumption and additional income), is ubiquitous in India. It is crucial for livelihood support of rural families, especially women, and has high potential of providing additional income and nutrition support. This model, which dominated Indian poultry market until the 1960s, has been almost totally replaced by a vertically integrated industrial model based on contract farming, where farmers work under contracts from large agribusiness corporations (Mehta and Nambiar, 2003). The large-scale commercial private sector, controls roughly 80% of total Indian poultry production and is concentrated in the southern states of Andhra Pradesh, Tamil Nadu and Karnataka (Hellin et al., 2015), followed by Punjab and Haryana in the north. Poultry meat has outpaced its chief competitors—beef and veal and buffalo meat (Mujahed Ali, 2015).

The growth in this sector can be attributed to a rapidly expanding middle class, and the emergence of vertically integrated poultry producers that have reduced consumer prices through mass production (APEDA, 2016a).

The growth of the poultry industry has been facilitated by a concomitant surge in domestic maize production (Dixon et al. 2008). Over 50% of maize production in India is now destined for the poultry industry (Chaudhary et al., 2012; Sethi et al., 2009) and in times of shortage, India has borne massive import bills for maize and while India has demanded non-GMO maize, scientists have warned that there is no certainty that the imports are free from GMOs or have not contaminated local maize (Reuters, 2016).

Production practices and industry—growing corporate concentration and contract farming

There are three main types of poultry farms—breeder, broiler and layer farms. The first is to breed chicks and the later are for meat and eggs respectively. A number of ‘integrators’ exist, who combine two or all of the functions above and dominate the poultry industry. Integrators own hatcheries, feed mills, slaughter facilities, sales outlets, veterinary, medicines, and brands of processed chicken.

There is growing market concentration by a number of corporate integrators. The main players are: Venkateshwara Group hatcheries (who control 60% of broiler market and 80% of layer market), Suguna Poultry Farms Ltd (20% of broiler market), CP-India (Charoen Pokphand Group), Pioneer Poultry Group, Godrej Tyson Foods Ltd. (a joint venture between Tyson Foods USA and Godrej India) and Skylark Group.

In India, 36.7% of broiler production is under contract farming with integrators like those mentioned above, and 78% of these are concentrated in Southern India. The remaining are non-contract farmers (Ramdas, 2015b).

Under contract farming arrangements, integrators supply day old chicks, feed, medicines, veterinary supplements, vaccines, equipment, marketing and credit while the farmer is expected to supply space, labor, infrastructure and water. Companies decide the rules, and can change them at their discretion. The terms of the contract favor the integrators. Researchers have reported that most farmers do not possess copies of the contract, which are almost never in the local language. The standards of the contract are very high and impose penalties on farmers in case of any infringements. The integrators pocket marketing profits (Ramdas 2015b).

Due to high production costs, contract farming is growing fast as contracting companies supply cheap inputs. Contract farmers, however, do not make higher profits than non-contract farmers, because the contracting companies take any efficiency related surplus profit. However due to market fluctuations they receive the security of an assured return, even if it is lower in comparison to non-contract farmers who face higher market risks (Sasidhar and Suvedi 2015).

In terms of size, a majority of all farms (about 70%) are small-scale (3,000–10,000 birds) and medium-scale (10,000–50,000 birds) farmers, but there is a trend towards growing farm size and smaller farms are becoming unviable due to expensive inputs, unless there are contract farming arrangements (APEDA, 2016b). Ten percent are large-scale farmers (50,000– 400,000 birds)—such farms are automated. Small farms operate on the deep litter system (Mehta and Nambiar, 2003). Most of these are located close to cities to facilitate easy transport to consumers.

Only 2–3% of the total poultry meat is processed, this is mainly because Indian consumers prefer live and fresh chicken butchered before their eyes, rather than frozen chicken (Mehta and Nambiar, 2003; Cobb, 2012)

Biodiversity and genetic base

The genetic base of the poultry industry is highly narrow and identical across the industry, which makes it highly vulnerable (Ramdas 2015b). Global trends are replicated in India. Three companies control global broiler breeding: Erich Wesjohann Group (Germany), Grimaud (France) and Cobb-Vantress (USA), which is owned by Tyson. Global layer breeding is controlled by two companies: Hendrix Genetics (Netherlands) and Erich Wesjohann Group (Gura, 2007). Cobb controls up to 75% of the broiler market in India while the BV300-layer breed, owned by Venkateshwara Hatcheries and developed in partnership with Babcock (Babcock is a brand of Hendrix Genetics Netherlands), controls more than 85% of the layer market in India (Cobb, 2012). There is a general perception that indigenous poultry varieties are 'non productive'. However, communities and veterinarians have shown that is not the case under improved conditions (Ramdas and Ashalatha, 2009).

Social, environmental, public health and ethical concerns

There are serious ethical concerns with poultry factory farming in India. At least 70% of eggs come from commercial farms, many of which confine hens to barren battery cages so small that each bird has less space than an A4 size sheet of paper in which to spend her entire life (Humane Society International 2013). The Animal Welfare Board of India has issued an advisory to all state governments stating that battery cages should not be used and existing ones should be phased out by 2017. However, this is not enforceable and does not indicate any real changes.

On the social front, there is greater industrialization and vertical integration. Even if some medium-scale and small-scale farmers have benefitted from employment, there are no clear implications on equity, or the impact on income and nutrition on the 80% of marginal farmers, mostly women, as they have no access to credit, inputs or markets (Mehta and Nambiar 2003; Hellin et al. 2015). The rise in contract farming is also a cause for concern, given the loss of power that farmers face before contracting companies.

There are also serious public health impacts. A study by the Center of Science and Environment revealed large-scale unregulated use of antibiotics as growth promoters by the poultry industry and high levels of antibiotics present in tested samples (CSE, 2014). Antibiotic resistance is a serious public health threat and India is the starkest example globally. Antibiotics are necessary to cure infections, but widespread use of antibiotics in areas like animal farming has led to rising pathogen resistance to antibiotics. India does not currently have regulatory provisions for the use of antimicrobials in cattle, chickens, and pigs raised for domestic consumption (Laxminarayan and Chaudhury, 2016). The close proximity of most industrial chicken farms to India's populated cities is a serious health threat. India's first case of Avian flu was detected in state, and reports pointed to infected birds of the Venkateshwara Hatcheries, who denied involvement (Nierenberg, 2007). It is India's biggest poultry company.

On the environmental front, intensive poultry production has led to issues around waste handling and managing pests and diseases. Chicken waste, such as blood manure and feathers, are a major nuisance in many parts of the country ('How chicken can cost India big', 2012). These issues are aggravated in southern India where

intensive production systems cluster geographically (Hellin et al., 2015). Most of the litter produced by the poultry industry is applied to agricultural land but in excess it causes environmental pollution (Bolan *et al.* 2010). Chicken litter contains poisonous substances like arsenic. Moreover, air pollution is a major issue around poultry farms—intensive systems lead to the dispersal of various toxins into the air such as microbes, endotoxins and mycotoxins.

There is also the risk of infection of backyard flocks by diseases that erupt in factory farms. Even if backyard poultry are more genetically diverse, making them more resistant to disease, they can't remain immune to the viruses like H5N1 avian flu for long. Such viruses circulate from factory farms to backyard flocks and then back in a more virulent form (Nierenberg, 2007).

Trade

India has recently lost a case against the USA at the WTO related to chicken leg imports. The US market which consumes more chicken breasts, has an overflow of chicken legs, which it plans to dump into the Indian market. The imports of such frozen legs, grown with the use of GMO feed—not permitted in India—and in unsustainable factory farms, will pose a threat to Indian consumers. Even if frozen meat is not preferred by Indian customers, their focus will be on large-scale institutional buyers like restaurants and hospitals, among others (Biswas, 2016). There is also high pressure on India from the US to allow imports of eggs ('WTO says India unfairly blocking imports of egg, poultry from US', 2015).

Recommendations: Dairy

1. Instead of blindly promoting foreign breeds, the government should support livestock keepers to improve their animals' food, water and other conditions. The success of the Indian Gir breed in Brazil could provide some inspiration in this regard.
2. The state must establish minimum support prices on dairy, as well as regulate and ensure procurement to protect livelihoods of small farmers.
3. Take action to stop price wars between private players and cooperatives that harm livelihoods of small producers (for example, regulate sales prices—large players must not be able to sell at rock bottom prices that pull down market prices and drive small farmers out of business).
4. The state must support, through legislations and other policies, small dairy producers to organize and form autonomous production collectives as well as consumers cooperatives.
5. Agriculture must be taken out of the WTO and other Free Trade Agreements. The case of the EU-India FTA's looming threat to Indian dairy is an example of the grave danger to small milk producers, the majority of who are poor.
6. Foreign direct investments in agriculture must be prohibited.

Recommendations: Poultry

1. Promote more backyard rearing of poultry, especially by women, of local indigenous chicken varieties, and provide technical support and exchange opportunities at local levels of agroecological rearing practices.

2. Promote conservation of local chicken varieties
3. Strictly regulated use of antibiotics in the poultry industry, especially those antibiotics critical for humans.
4. Set pollution control standards for the poultry industry.
5. Regulate contract farming and uphold farmer's rights.

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